****DRAFT****

Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

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Date: 06/08/04

PNVG Code: (CODE)
JPLF
Jack pine low FRI

Potential Natural Vegetation Group: Great Lakes pine forests: Jack pine barrens with relatively low fire frequencies.

Geographic Area: Michigan, Wisconsin, Minnesota

Description: Potential natural vegetation group common to very dry outwash plains or dunal areas with coarse-textured sandy soils. Jack pine, red pine and barrens predominate. Aspen, white oak, and white pine may be present ?? In Wisconsin and the upper peninsula of Michigan these areas are interspersed with relatively fire resistant wetlands, resulting in lower fire frequencies. Other areas historically had lower fire frequencies because they are directly downwind from large water bodies such as Lake Michigan.

Fire Regime Description: Fire regime group IV with fires occurring every 50 to 100 years and high stand replacement severity. Severe wind events affect mature stands on an approximate 220 year interval.

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	10	Barrens dominated by carex, grasses, and herbaceous plants. Trees comprise less than 10% canopy coverage.
B: mid- seral young	15	Young jack pine stands less than 15 years of age.
C: mid-seral mature	40	Jack pine dominated stands 15 to 100 years. In absence of fire most jack pine die by age 100 and this class reverts to barrens (80%) or red pine (20%)
D: late- seral young	15	Open red pine/jack pine stands less than 50 years of age
E: late- seral mature	20	Open and closed red pine stands greater than 50 years of age
Total	100	

*Formal codes for classes A-E are:

All classes burn at an average rate of 2 % per year with the caveat that stands do not reburn for 10 years. This is equivalent to a 60 year fire return interval. In jack pine stands fire severity increases with age with nearly 100 mortality in mature stands. Cones are serotinous and areas quickly regenerate to jack pine. In contrast, red pine stands are more susceptible to replacement fires before age 50. Non-lethal surface fires predominate in mature red pine stands. Both species are short lived with jack pine living to about age 100 and red pine to age 150. The fire frequency and severity varies by succession class as follows:

A: **Barrens**: All fires are replacement and set this class back to barrens. Without fire barrens persist for 25 years before they regenerate to jack pine (75%) or red pine (25%).

B: **Jack pine stands less than 15 years of age**. Fires are 60 % replacement and 40 % mosaic. Since jack pine do not produce viable seed until about age 15, replacement fires result in a barren.

C: **Jack pine stands 15-100 years of age**. Fires in this class are 80 % replacement and 20 % mosaic. Fire severity increases with age. Replacement fires result in a young jack pine stand. The few stands that escape replacement fire die after age 100 and revert to barrens (75%) and red pine (25%).

D: **Open red pine/jack pine stands less than 50 years of age**. Fires are 75 % replacement and 25 % mosaic. Since red pine on these sites doesn't produce viable sufficient seed until age 50, replacement burns result in a barren. Fires tend to be more severe on these sites than on sites with higher fire frequencies due to the buildup of fuels.

E. **Open red pine stands greater than 50 years of age.** Larger red pine are more resilient to wildfire. Assumed fire severities are 80 % non-lethal surface fires and 20 % replacement fires. Red pine stands die after age 150 and revert to young red pine stands. Surface fires maintain stands at a lower stocking level allowing for less moisture competition for individual trees. Repeated surface fires prolong the life of the large trees.

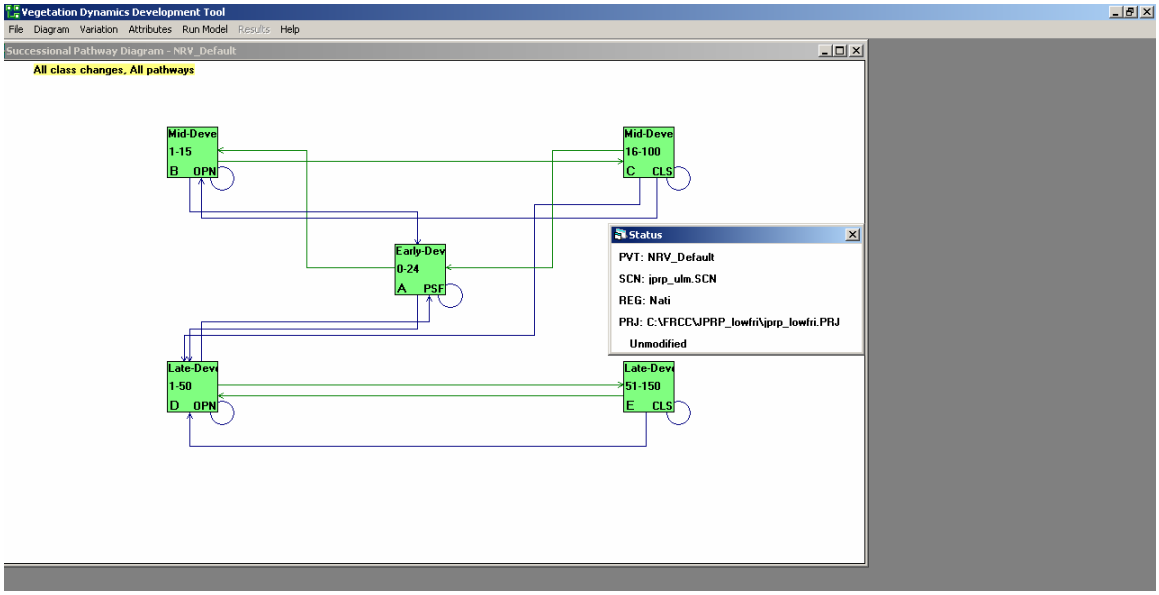
Fire Severity	Fire Frequency (yrs)	Probability	Percent, All Fires	Description
Replacement Fire	100	.01	70	All fires in barrens and 80 % of fires in mature jack pine are replacement
Non-Replacement Fire	150	.007	30	Primarily surface fire in older red pine. Mosaic fire in young classes.
All Fire Frequency*	60	.017	100	

*All Fire Probability = sum of replacement fire and non-replacement fire probabilities. All Fire Frequency = inverse of all fire probability (previous calculation).

References

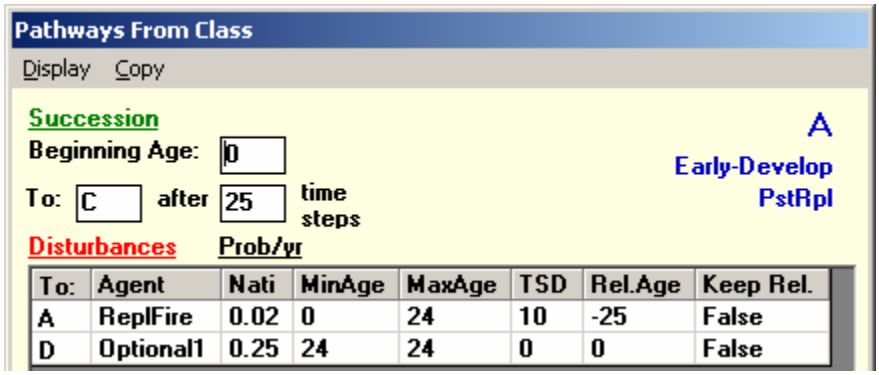
Cleland

VDDT file documentation: Model is located in C:\FRCC\jp_lowfri. Text files must be located directly in C:\FRCC for project file to work.



Disturbances by class:

Class A: All fires are replacement and occur only after 10 years have elapsed since the previous fire (TSD=10). Class A succeeds to a young jack pine stand (Class C). Optional1 disturbance is used to succeed 25 % of class to red pine (class D).



To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
A	ReplFire	0.02	0	24	10	-25	False
D	Optional1	0.25	24	24	0	0	False

Class B - young jack pine < 15 years: Fires are 60% replacement and 40 % mosaic. Replacement burn areas go to barrens (class A) due to lack of jack pine seed

Pathways From Class

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Succession
Beginning Age: 1
To: C after 15 time steps

B
Mid-Develop
Open

Disturbances Prob/yr

To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
A	ReplFire	0.012	1	15	10	0	False
B	MosaicFire	0.008	1	15	10	0	False

Class C– mature jack pine: Fires are 80 % replacement and 20% mosaic and occur 10 or more years following previous fire. Stands die if they live to 100 years and go to barrens (75 %) or red pine (25 %). Stands may also blow down at about a 220 year interval.

Pathways From Class

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Succession
Beginning Age: 16
To: A after 85 time steps

C
Mid-Develop
Clsd

Disturbances Prob/yr

To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
B	ReplFire	0.016	16	100	10	0	False
B	WindWethStres	0.0046	16	100	0	0	False
C	MosaicFire	0.004	16	100	10	0	False
D	Optional1	0.25	100	100	0	0	False

Class D – young red pine < 50 years: Fires are 75 % replacement and 25 % mosaic. Replacement fires go barrens (class A).

Pathways From Class

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Succession
Beginning Age: 1
To: E after 50 time steps

D
Late-Develop
Open

Disturbances Prob/yr

To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
A	ReplFire	0.015	1	50	10	0	False
D	MosaicFire	0.005	1	50	10	0	False

Class E– older red pine >50 years: Fires are 20 % replacement and 80 % surface. Replacement fires go young red pine (class D). Stands die after age 150 and revert to young red pine. Surface fires reduce stocking and moisture competition of remaining trees increasing the time stands can remain in this class.

Pathways From Class

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Succession E

Beginning Age: 51 Late-Develop

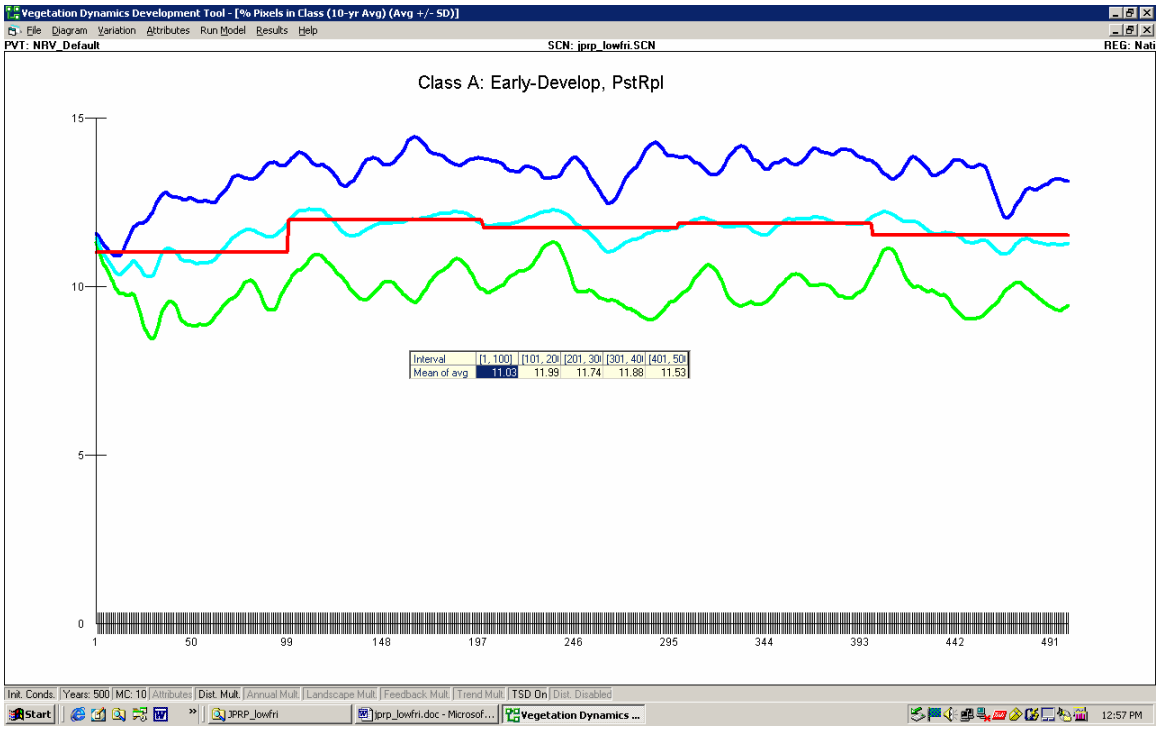
To: D after 100 time steps Clsd

Disturbances Prob/yr

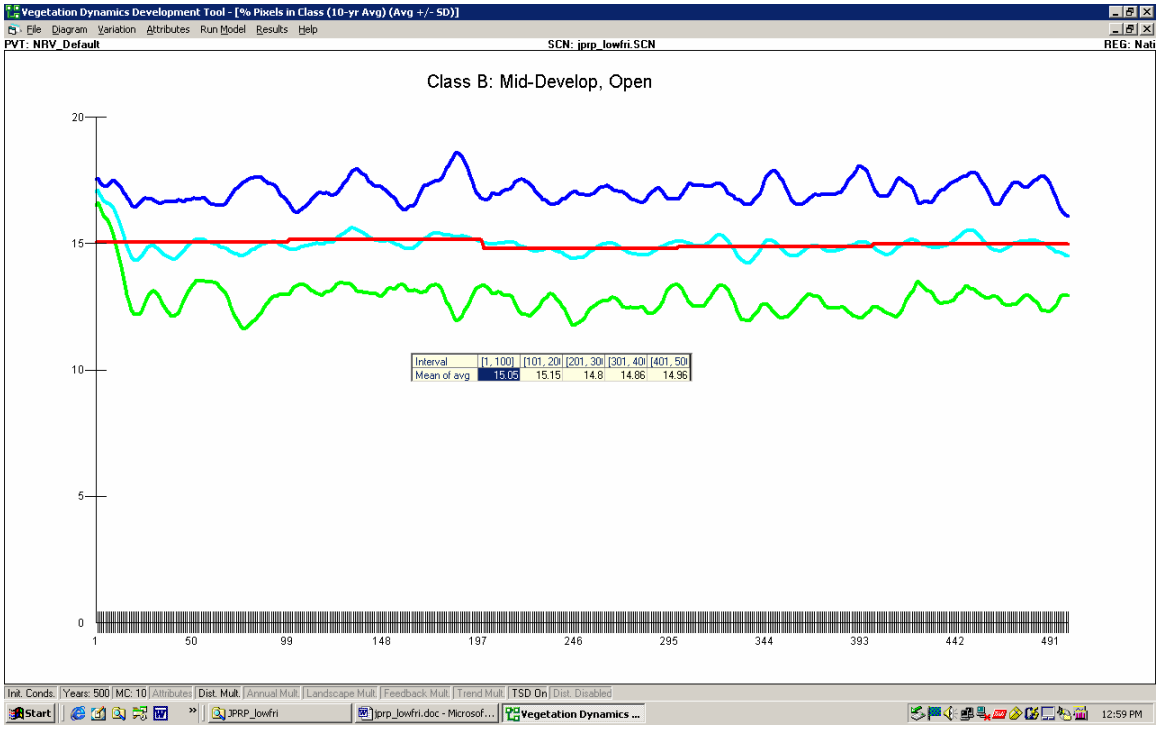
To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
D	ReplFire	0.002	51	150	10	0	False
D	WindWethStres	0.0046	51	150	0	0	False
E	SurfFire	0.018	51	150	10	-10	False

Results: Per cent of area by class for 500 years. Ten-year-average + or - 2 SD's.

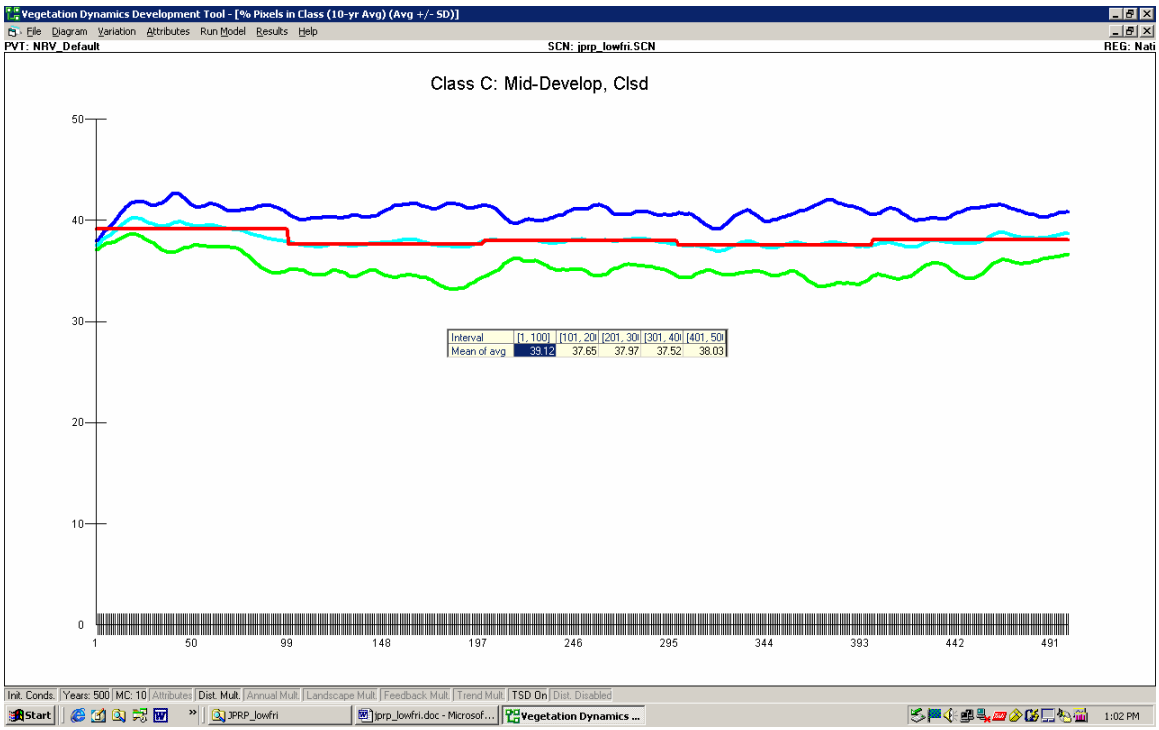
A: Barrens:



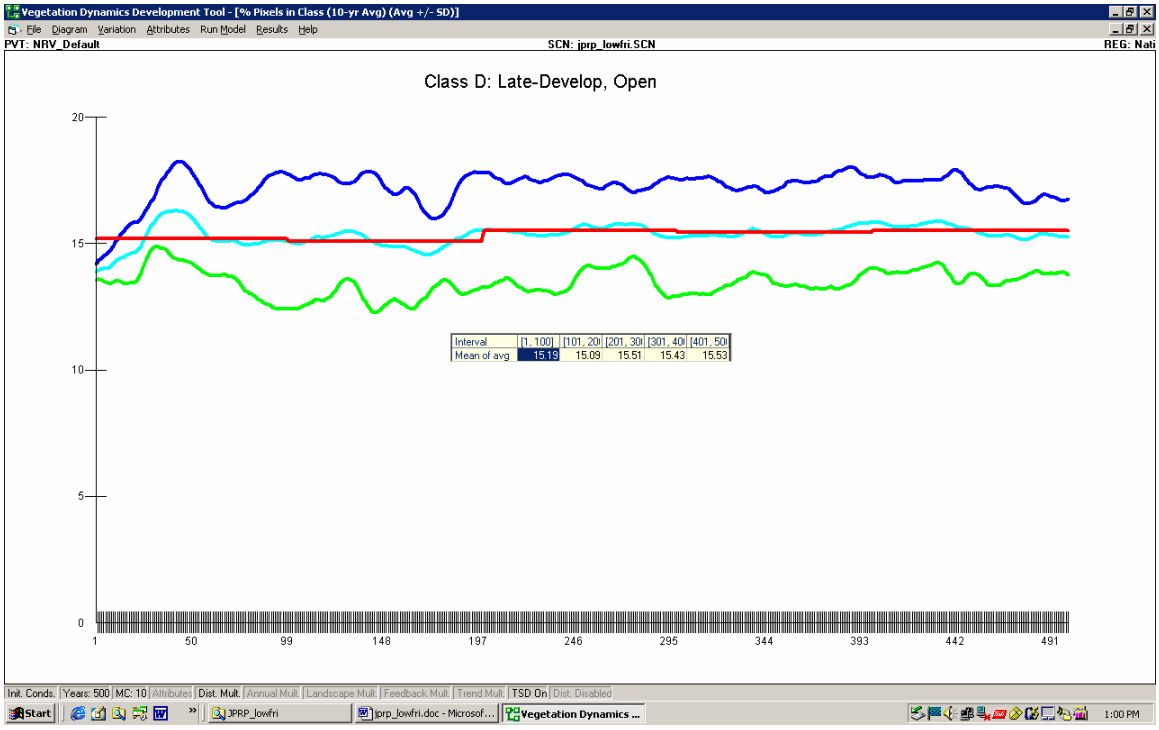
B: Young jack pine stands < 15 years of age



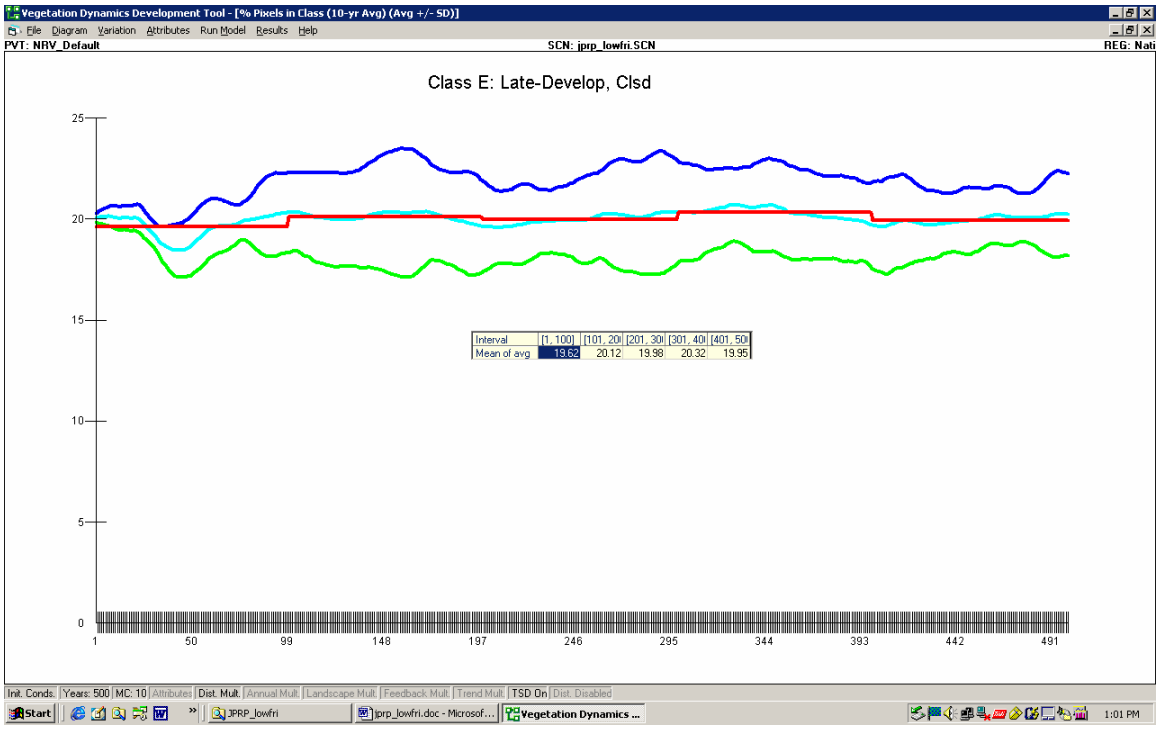
C: Jack pine mature 15-100 years



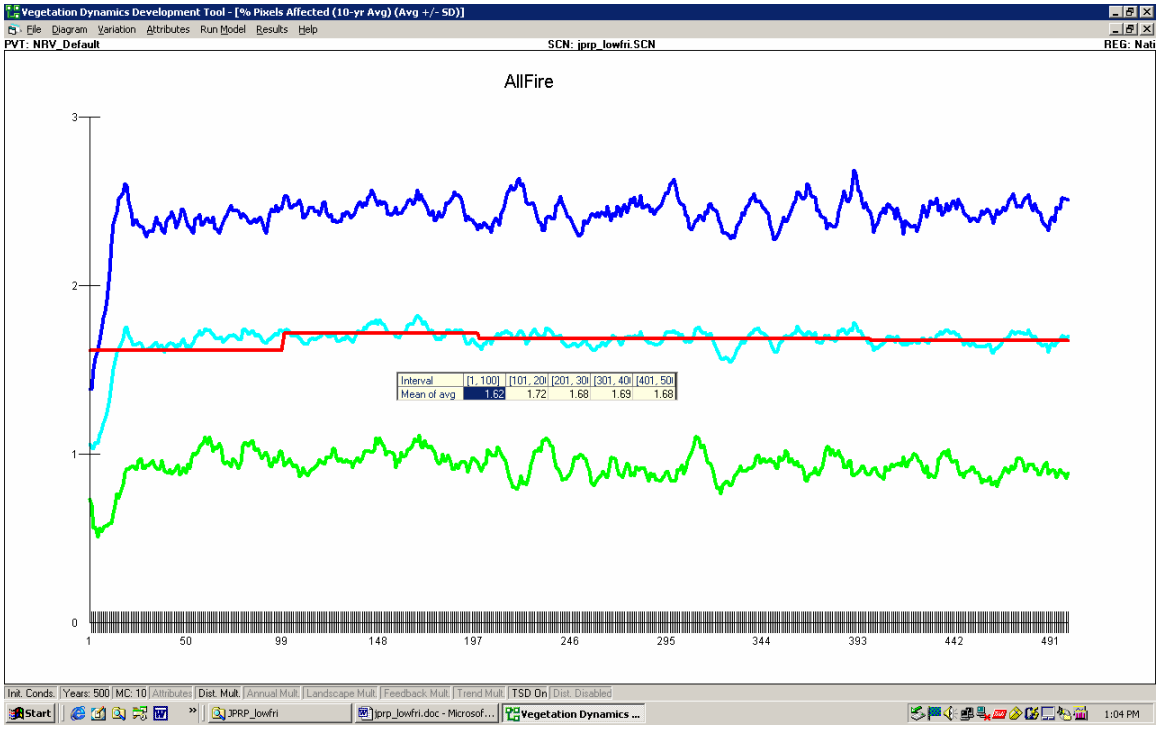
D: Young red pine stands < 50 years of age



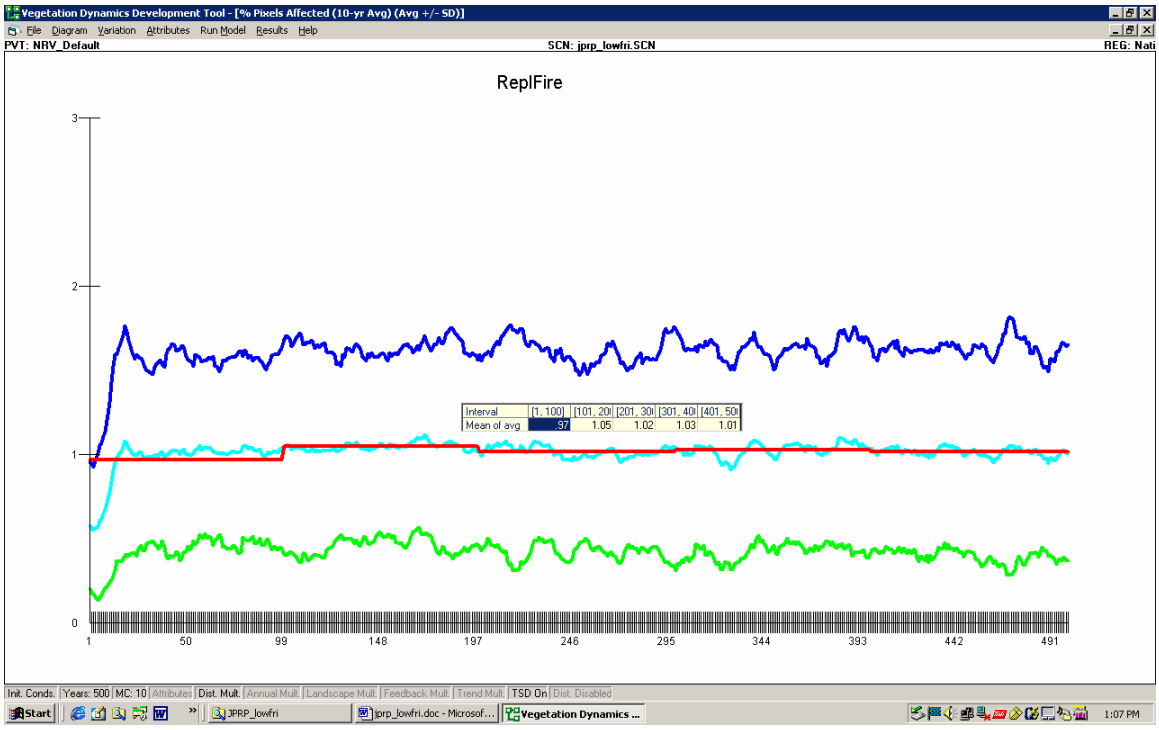
E: Older red pine stands > 50 years of age



All fire frequency: 1.7 % of the area burns/year for a FRI of 60 years.



Replacement fire frequency: 1.0 % of the area burns/year for a FRI of 100 years.



Non-replacement fire frequency: 0.66 % of the area burns/year for a FRI of 150 years.